ONTARIO MINISTRY OF ENVIRONMENT
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1971 OPERATING SUMMARY

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CAMPBELLFORD

WATER POLLUTION CONTROL PLANT

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1971

Campbellford : water pollution control plant.

81443

Water management in Ontario

Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in this summary.

D.S. Caverly,
General Manager.

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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CAMPBELLFORD

WATER POLLUTION CONTROL PLANT

1971 ANNUAL OPERATING SUMMARY

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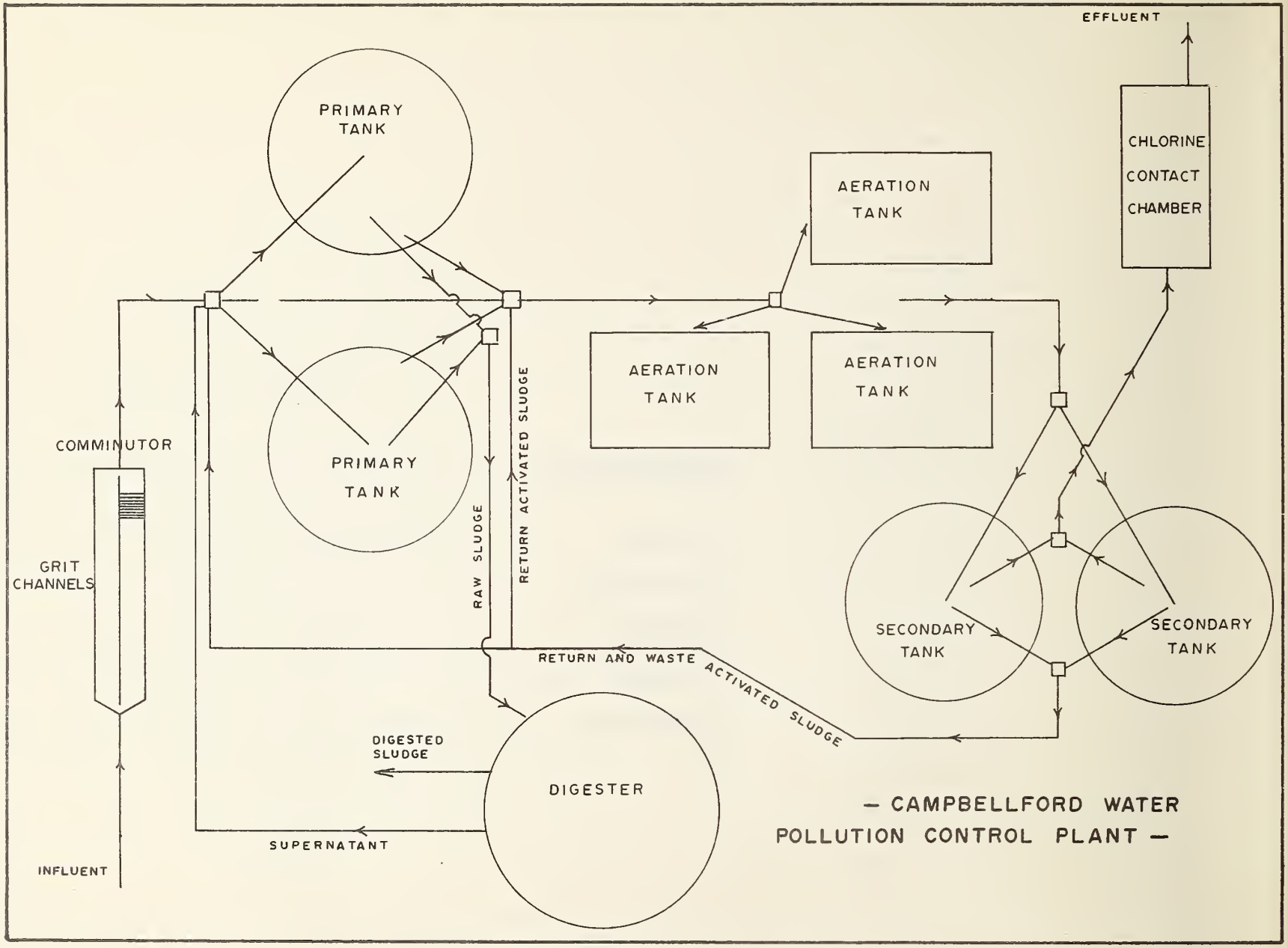

EFFLUENT
PRIMARY TANK
CHLORINE CONTACT CHAMBER
AERATION TANK
AERATION TANK
AERATION TANK
PRIMARY TANK
COMMINUTOR
GRIT CHANNELS
RAW SLUDGE
RETURN ACTIVATED SLUDGE
SECONDARY TANK
SECONDARY TANK
RETURN AND WASTE ACTIVATED SLUDGE
DIGESTED SLUDGE
DIGESTER
SUPERNATANT
INFLUENT
— CAMPBELLFORD WATER POLLUTION CONTROL PLANT —

DESIGN DATA

PROJECT NO.	1-0028-66
DESIGN FLOW	1.0 MIGD
BOD - Raw Sewage	200 mg/l
TREATMENT	Activated Sludge
DESIGN POPULATION	4200

PRIMARY TREATMENT

Grit Removal

Type: Channels, manually cleaned
Size: Two 36'6"x2'8"x3'9"
Flow Velocity: 1 fps

Screening

Type: Manually cleaned

Comminution

Type: Worthington model 15C-5

Primary Sedimentation

Type: Dorr-Oliver-Long S-7
Size: Two 40'dia x 7' swd
Retention: 2.4 hours
Loading: Surface 400 gal/ft^2/day
Weir 4000 gal/ft/day

Outfall

- to the Trent River

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical
Size: Three, each 55,000 gallons
Retention: 4 hours
Air Supply: Simon Carves, one aerator per tank

Secondary Sedimentation

Type: Dorr-Oliver-Long S-7
Size: Two 45' dia x 9' swd
Retention: 4.8 hours
Loading: Surface 330 gal/ft^2/day
Weir 3540 gal/ft/day

CHLORINATION

Type: Wallace & Tiernan V800
Size: One 400

Chlorine Contact Chamber

Retention: 30 minutes

DIGESTION SYSTEM

Type: Single stage
Size: 30' dia x 25' swd

PUMPING STATION

P.S. #1

Three Crane Deming each 800 US gpm @ 38' tdh

P.S. #2

Two Flygt CP3100 each 400 US gpm @ 24' tdh

'71 Review

GENERAL

This project consists of a 1.0 IMGD conventional activated sludge plant with single stage digestion, two pumping stations and associated forcemains and trunk sewers. Operation of the water pollution control plant by the Plant Operations Branch commenced on February 22, 1971. The official plant opening was held on August 18, 1971. The plant staff consist of two men, a chief operator and an operator.

Operating problems during the year consisted of normal problems related to plant startup and certain equipment deficiencies at the plant. As a result of the bankruptcy of the general contractor, the plant staff spent considerable time completing some of the plant deficiencies.

The digester gas pipe train was changed by plant staff from 3 inch steel to 2 inch ALDYL "A" pipe.

The seals on the raw sewage pumps at pumping station #1 were changed from single ended to double ended mechanical seals thus providing a substantial saving in the cost of water for the station.

A program to eliminate infiltration to the trunk sewer has been set up and the design of a new trunk sewer under the Trent Canal should commence during 1972.

EXPENDITURES

The 1971 operating costs were $40,419.37. This exceeded the budget of $29,000 by 39 percent due to large expenditures for equipment, higher than anticipated power costs due to the very high flows and higher than anticipated payroll costs.

PLANT FLOWS and CHLORINATION

A total of 350 million gallons of raw sewage was treated between June and December 1971. This represents an average daily flow of 1.6 imgd. The daily flow exceeded the design capacity on 100 percent of the days. The high flows are a result of infiltration and measures are being taken to reduce the amount of this infiltration.

Chlorination was carried out continuously. A total of 7711 pounds of chlorine was used to provide an average dosage of 2.2 mg/l.

PLANT EFFICIENCY

The average influent BOD and suspended solids concentrations were 107 mg/l and 135 mg/l respectively. The effluent BOD and suspended solids concentrations were 6 mg/l and 12 mg/l respectively representing a BOD and suspended solids reduction of 95 and 90 percent respectively.

The low influent concentrations are a result of the large amount of infiltration to the sewer system.

The suspended solids concentration of the primary effluent exceeds the suspended solids concentration of the plant influent because return from the digester enters the system between the point of sampling for sewage influent and the primary clarifier has not been considered in tabulation of primary efficiency.

SLUDGE DIGESTION and DISPOSAL

A total of 1,063,000 gallons of raw sludge with a solids concentration of 4.2 percent was pumped to the digester and 39,900 gallons of digested sludge with a solids concentration of approximately 5.4 percent were disposed of by tank truck haulage.

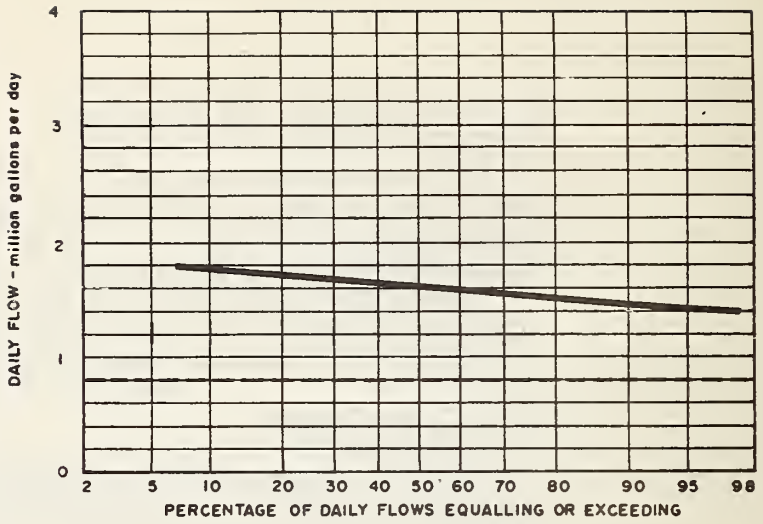
CONCLUSIONS and RECOMMENDATIONS

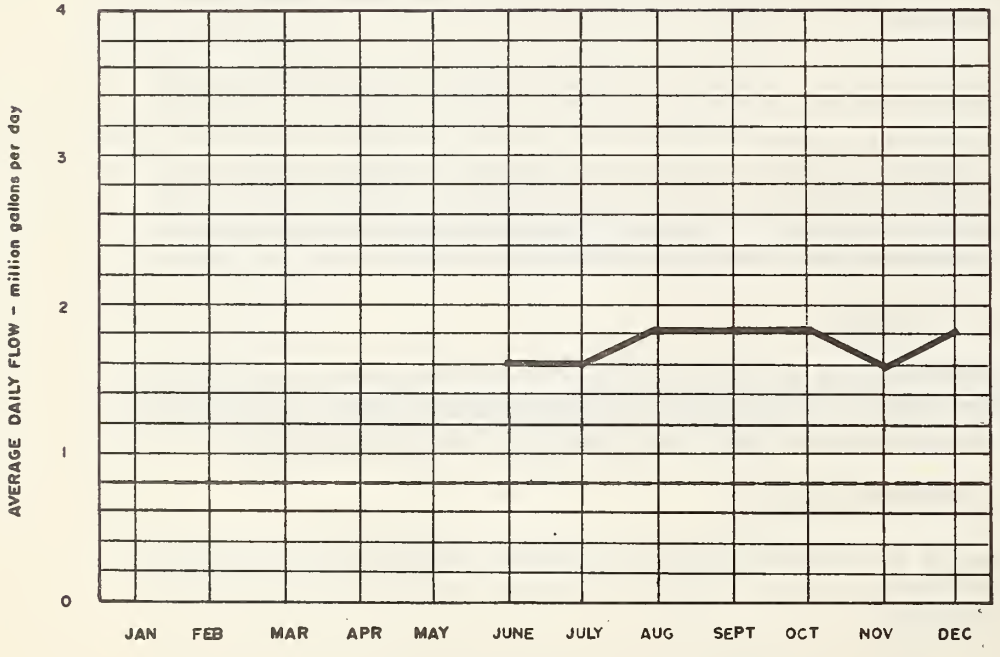
The first year of operation has resulted in the elimination of many of the operating problems associated with the start up of the project. The plant has provided satisfactory treatment of the sewage.

Infiltration in the sewer system is a serious problem. It is very important that steps be taken to reduce this infiltration which is causing the hydraulic overload of the plant.

PROCESS DATA

FLOWS



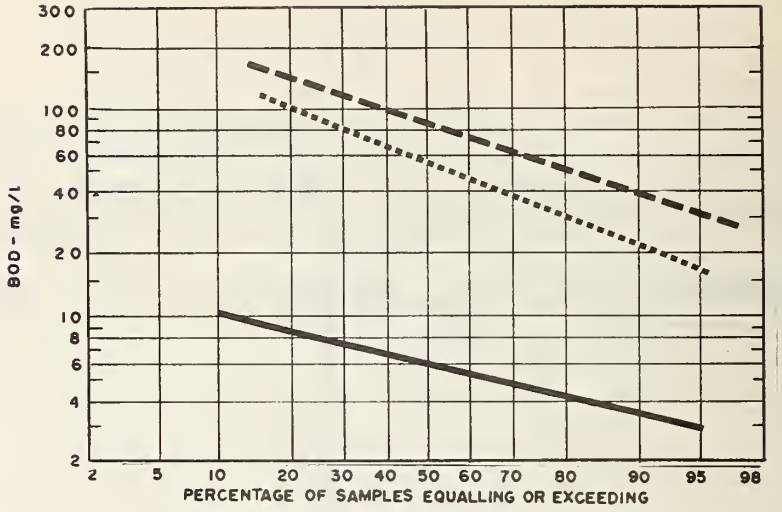


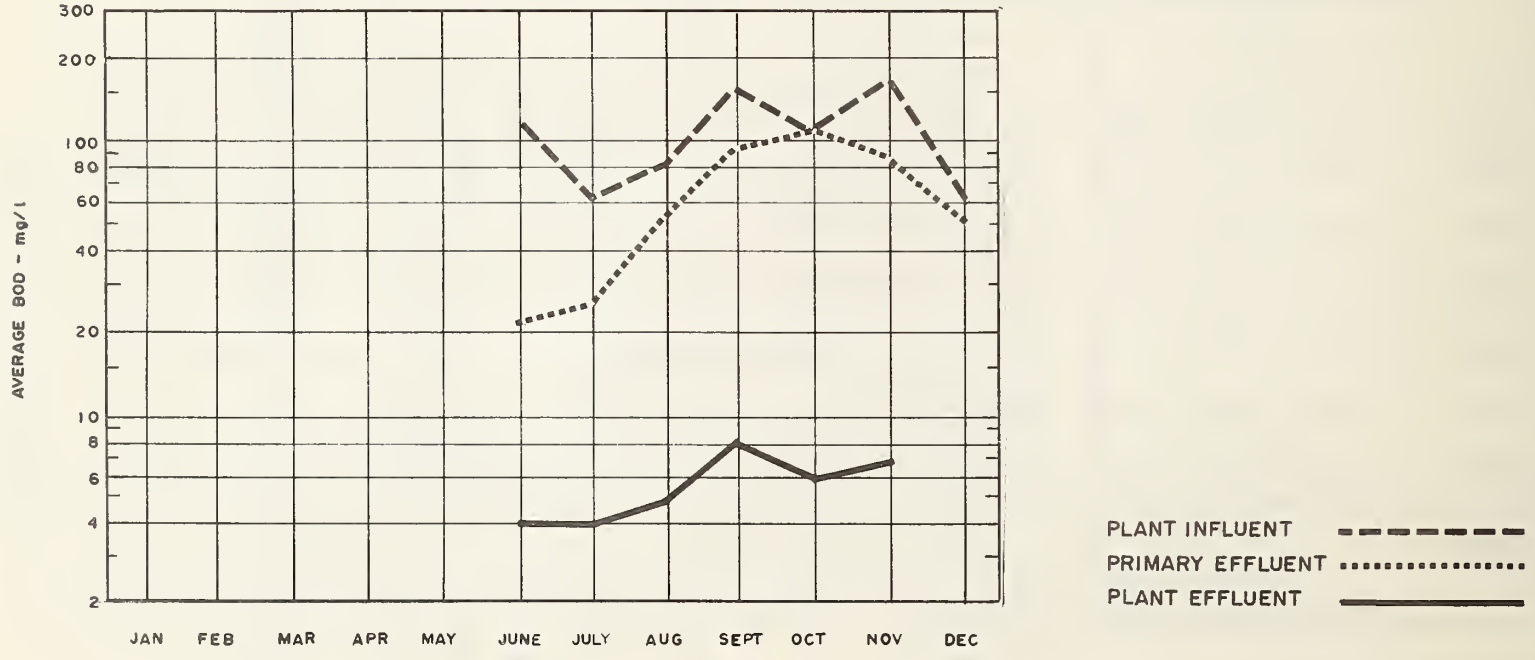
DESIGN CAPACITY _ _ _ _ _ _ _ _

PLANT PERFORMANCE

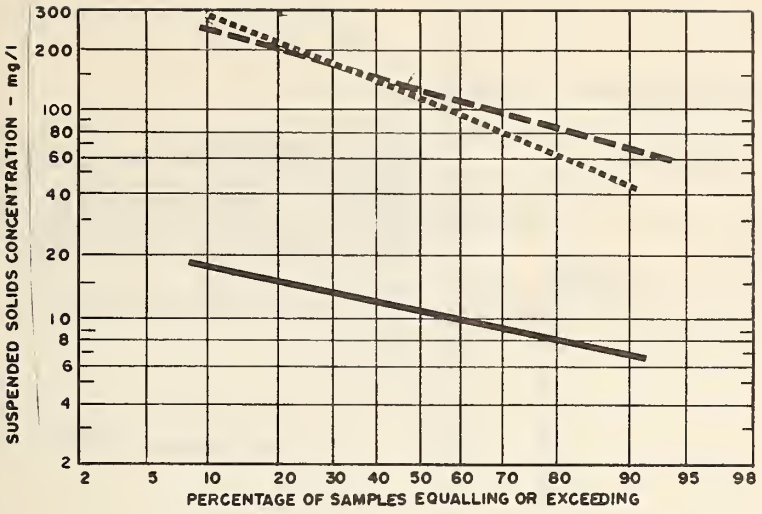
MONTH	FLOWS				BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				TOTAL PHOSPHORUS		
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	MAXIMUM RATE	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDN
	million gallons	mil gal	mil gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l as P	mg/l as P	%
JAN															
FEB															
MAR															
APR															
MAY															
JUNE	47.1	1.6	1.8	1.9	112	4	96	51	146	13	91	54	-	-	-
JULY	49.8	1.6	1.7	2.0	62	4	94	29	72	19	74	26	2.0	.5	75
AUG	51.1	1.7	1.9	2.1	82	5	94	39	113	13	88	51	2.5	.7	72
SEPT	51.5	1.7	1.8	2.1	155	8	95	76	160	12	93	76	4.4	.4	91
OCT	53.6	1.7	1.9	2.1	115	6	95	58	166	9	95	84	4.6	.2	96
NOV	46.7	1.6	1.7	2.1	134	7	95	59	147	10	93	64	7.8	.5	94
DEC	50.8	1.7	1.8	2.4	60	-	-	-	154	10	94	73	2.5	.9	64
TOTAL	350.6	-	-	-	-	-	-	-	-	-	-	428	-	-	-
AVG.	-	1.6	MAXIMUM 1.9	MAXIMUM 2.4	107	6	95	52	135	12	90	61	4.0	.5	88
No. of Samples	-	-	-	-	14	12	-	-	40	43	-	-	6	6	-

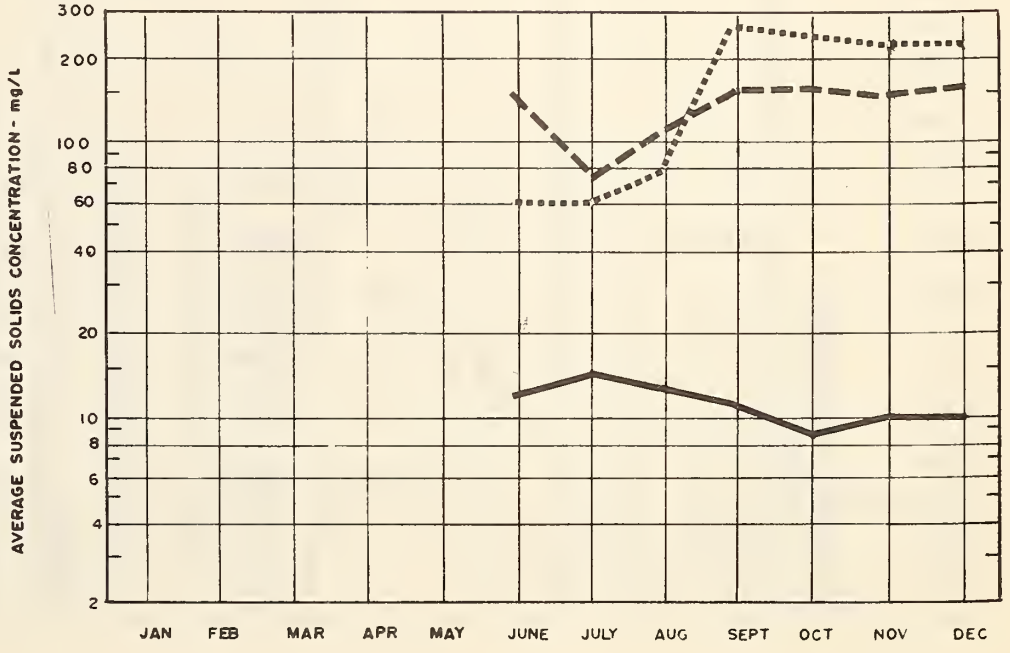
BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



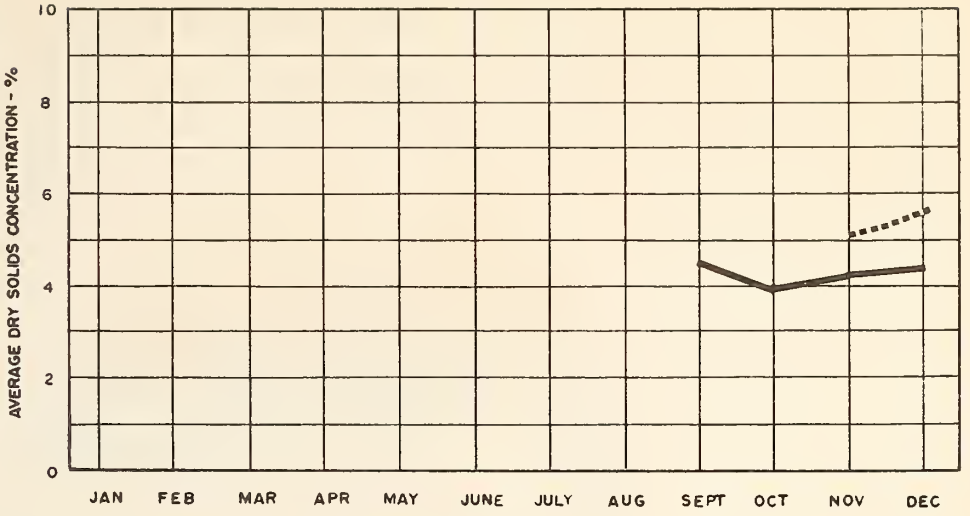


PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT

TREATMENT DATA

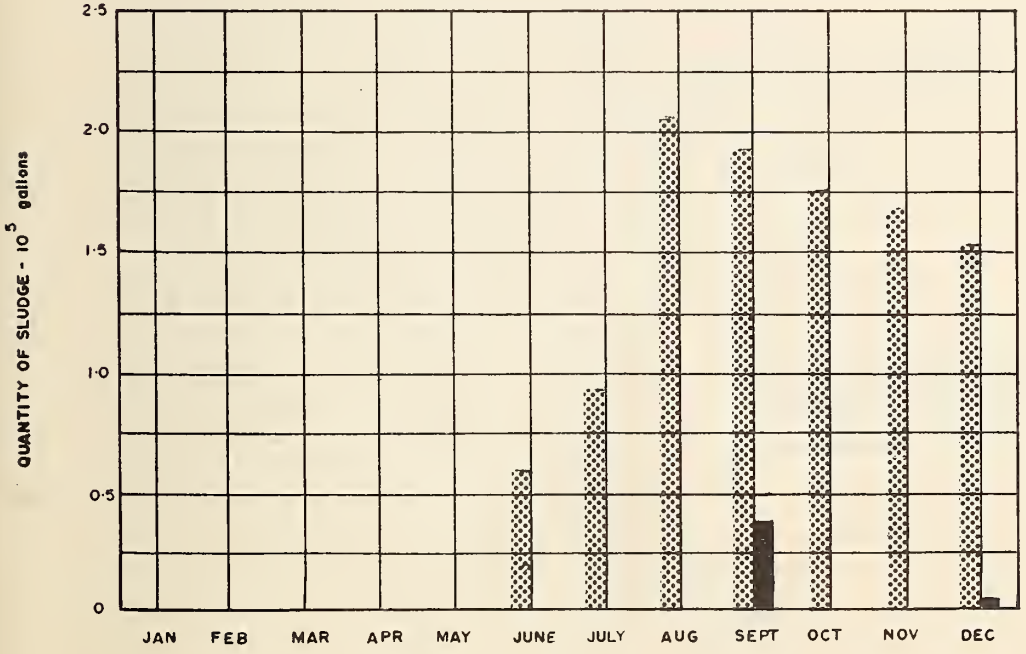
MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-	
	QUANTITY REMOVED cubic feet	Cl_2 USED 10^3 pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	NATANT T. S. %	AMOUNT HAULED cubic yards
JAN																
FEB																
MAR																
APR																
MAY																
JUNE	198	826	1.8	21	60	2280	-	-	66	-	-	0	-	-	-	0
JULY	54	1058	2.1	28	60	2560	-	-	94	-	-	0	-	-	-	0
AUG	59	1202	2.4	55	85	2690	-	-	211	-	-	0	-	-	-	0
SEPT	155	1366	2.7	95	282	3090	-	-	196	4.5	50	37.4	-	-	2.1	222
OCT	34	1371	2.6	115	258	3540	-	-	175	4.0	54	0	-	-	-	0
NOV	27	1109	2.4	83	230	3980	-	-	170	4.1	54	0	5.1	40	2.4	0
DEC	36	779	1.5	55	232	3590	-	-	151	4.2	61	2.5	5.6	42	2.0	15
TOTAL	563	7711	-	-	-	-	-	-	1063	-	-	39.9	-	-	-	237
AVG.	1.6 cu.ft/mil gal	1102	2.2	65	167	3100	-	-	152	4.2	55	19.9	5.4	41	2.2	118

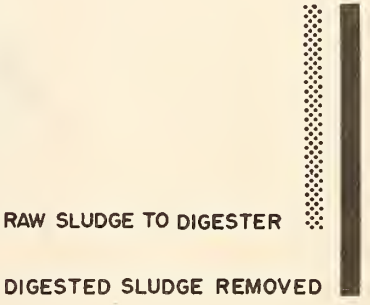
DIGESTION

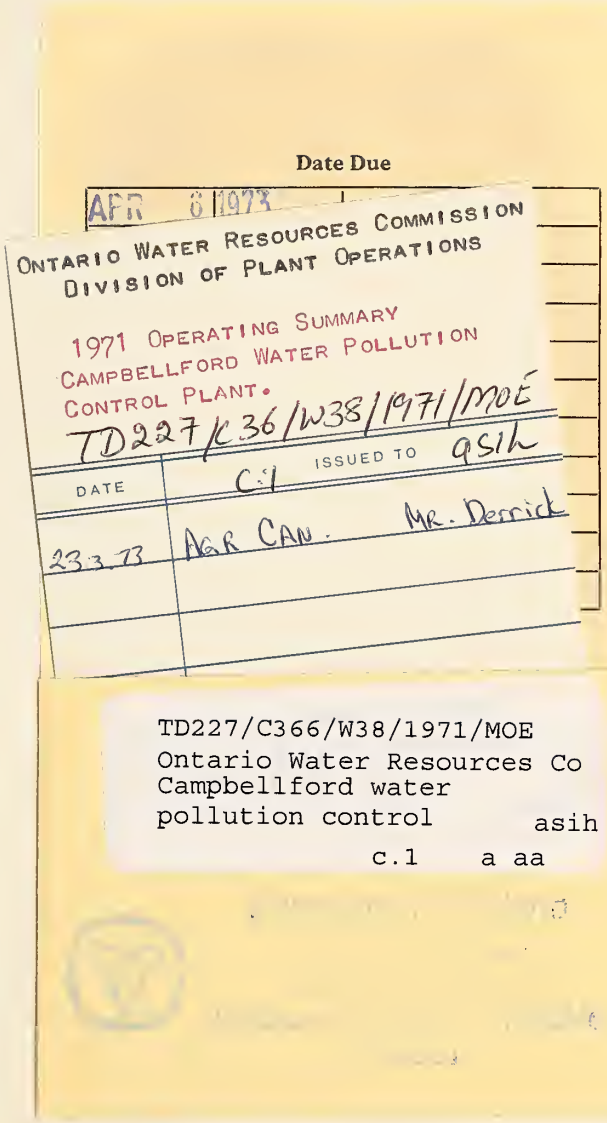


RAW SLUDGE .....

DIGESTED SLUDGE ———







Date Due

APR 6 1973

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS

1971 OPERATING SUMMARY
CAMPBELLFORD WATER POLLUTION
CONTROL PLANT.

TD227/C36/W38/1971/MOE

DATE	C.1 ISSUED TO asih
23.3.73	AGR CAN. MR. Derrick

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1971

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